

# **N-Wave Networking Services Service Catalog**

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## **Introduction**

N-Wave offers a number of networking services for NOAA wide customers. This catalogue identifies each of these services, lists the service description, service characteristics and service level objectives, (i.e. target service estimates). It also identifies the clients of the service, business processes enabled by the service, customer roles and responsibilities and how to access the service.

This service catalogue is the default, or base, list of services offered between N-Wave and the NOAA user community and it will help identify what service levels can be expected for a particular service or product. It is understood that some customers may have unique requirements for services and these requirements will need to be negotiated, defined and signed-off on. An N-Wave to customer Memorandum of Agreement (MOA), or Line Office Agreement (LOA) with service cost details will reference this catalog and be the documents of authority for service governance.

## Key Service: N-Wave Network Management Office

### Service description

The N-Wave Network Management Office is the single source of responsibility for all aspects of management, operation and delivery of the four Key Technical Services offered and defined in this service catalog:

1. N-Wave Science Network
2. Network Operations Center Support
3. Network Assessment, Consulting, Design and Support
4. Trusted Internet Connection Access Provider Transport and Integration

#### Activities include:

- Budget
- Contracting
- Outreach
- Customer Relations
- Project Management
- Security Compliance
- Intra Service Integration
- NOAA Networking Consolidation Initiatives
- Coordinate and facilitate agreements documents with customers

### Service characteristics

Ongoing service to support NOAA customers

The goal of the N-Wave Management Office is to ensure operational availability and stability of all technical services within this catalog by providing exceptional customer service and support, all while meeting and exceeding NOAA wide networking initiatives.

Where the technical services require integration and or handoff to another service (e.g. Trusted Internet Connection with the NOAA SOC) the N-Wave Network Management Office will be the liaison and coordinate all technical and management activities for seamless service integration on behalf of its customers.

The N-Wave Network Management Office will coordinate with designated NOAA program managers and technical leads for all activities surrounding networking consolidation initiatives where services outlined within this catalog may be required and or affected.

Service level objective
<p><b>Service level targets:</b></p> <ul style="list-style-type: none"> <li>• Provide innovative networking capabilities with integrity, excellence, value and flexibility, to enable NOAA's science and research through reliable high-performance networking.</li> <li>• Ensure the security of the network by meeting DOC/NOAA policies, procedures and controls, and guidance of FIPS 199 and NIST SP 800-60 categorization for moderate systems.</li> </ul>
Customers of this service
<p>All customers of the technical services outlined in this catalog receive the full attention and activities from the Management Offices.</p>
Business processes enabled by this service
<p>This service supports the process for managing networking related inquiries for all services within this catalog for all customers. This office,</p> <ul style="list-style-type: none"> <li>• Provides a single point of contact for customers requiring information concerning the technical services rendered</li> <li>• Deliverers responsive management support to all customers</li> </ul>
Customer role
<ul style="list-style-type: none"> <li>• Maintain points of contact with the N-Wave Network Management Office to include key stakeholder names, email and phone numbers</li> </ul>
How to access this service
<p>Contact the N-Wave Program Management Office:</p> <p>N-Wave Network Outreach Office  Rhonda Lange  303-497-6045  <a href="mailto:Rhonda.K.Lange@noaa.gov">Rhonda.K.Lange@noaa.gov</a></p> <p>N-Wave Network Manager  Jerry Janssen  303-497-6647  <a href="mailto:jerry.janssen@noaa.gov">jerry.janssen@noaa.gov</a></p> <p>N-Wave Network Deputy Manager</p>

Robert Sears  
303-497-4226  
[Robert.Sears@noaa.gov](mailto:Robert.Sears@noaa.gov)

## 1. Key Technical Service: N-Wave Science Network

### Service description

N-Wave is a general-purpose NOAA owned and operated shared MPLS network consisting of a private carrier class network backbone that supports NOAA's scientific mission by providing high speed networking services to NOAA customer sites, programs, line offices, and research facilities.

N-Wave is comprised of two activity areas: Core Services and Access Services. Core Services are the shared services used by all N-Wave customers. Access Services are those services unique to the individual customer site in order to transport the customer to the NOAA core backbone.

#### **Core Activities include:**

- N-Wave management and operations of the national backbone including contracting support, logistics and security
- Network Transport – ordering and coordinating the installation and ongoing management of telecommunications carrier services
- Service assurance including incident management and problem management
- Network Engineering
- Asset and Configuration Management of all N-Wave devices including routers, firewalls, and management devices
- Performance management
- Network Operation Center (NOC) for monitoring, performance help desk, and advanced engineering and network performance applications ([see key service: Network Operations](#))

#### **Access Activities include:**

- Management, contracting, operations, and engineering interaction with local carriers for transport to the N-Wave core backbone
- Management, contracting, operations, and engineering with the required WAN providers for connectivity to N-Wave core backbone
- Engineering, configuration, monitoring, management, and interaction with any customer edge router/switch

**Technical Activities across Core and Access services:**

- Order and assure delivery of circuits and related carrier services
- Provision 10G access and core connectivity per customer request
- Provision 1G access and core connectivity per customer request
- Perform acceptance circuit testing by generating a maximum capacity load for each circuit
- Configure and manage the N-Wave Customer site aggregation routers, switches, and any security devices within the N-Wave system boundary
- Establish required VRFs at all N-Wave locations
- Procure N-Wave edge devices
- Establish and manage vendor maintenance agreements supporting the N-Wave infrastructure (those devices within the N-Wave system boundary)
- Monitor circuits and devices to proactively identify incidents
- Respond to, isolate, and develop appropriate corrective actions for outages or performance problems
- Coordinate with customer Help Desk of either scheduled or unplanned outages in accordance

**Service characteristics**

Ongoing service to support NOAA customers

- 1G/10G Core and access connectivity, single or dual homed customer access
- Customer unique VRF
- Access to shared and or enterprise VRFs

**Network Availability and Stability**

- The N-Wave backbone is built on a fully meshed, fully redundant architecture consisting of path redundancy and hardware redundancy at Core backbone sites with the exception of the Seattle core site which will gain path redundancy in the future.
- The network architecture coupled with 24x7x365 Network Operation services has resulted in 99.9999% uptime of the N-Wave core backbone.
- For customer sites seeking high levels of availability, redundant connections to the N-Wave core at different core locations is required.

**Service level objective****Service level targets:**

- Maintain availability and stability of the core network backbone and customer access links ([see key service: Network Operations](#))
- Ensure the security of the network by meeting DOC/NOAA policies, procedures and controls, and guidance of FIPS 199 and NIST SP 800-60 categorization for moderate systems.
- Ensure optimal delivery of networking services through integration of advanced monitoring and statistical tools to measure overall health and to use for capacity planning

#### Customers of this service

##### **NOAA Programs:**

N-Wave is a consolidated agency-wide network asset and resource that meets NOAA's scientific connectivity requirements and where appropriate, can supplement NOAA's operational connectivity requirements.

##### **DOC and other Agency:**

N-Wave can be utilized by DOC and other Federal agencies for inter agency or program transport and or NOAA to agency collaboration. As of the date of this service catalog, NOAA is the sole user of the infrastructure.

##### **NOAA Collaborators:**

Due to the strategic location of NOAA core equipment, N-Wave is well suited for peering with and or cross connectivity to other agencies and/or scientific collaborators at the NOAA customer level. The MPLS technology N-Wave is built on allows for private NOAA to NOAA, NOAA to collaborate communication across the backbone separated from other customers.

#### Business processes enabled by this service

This service is managed under the N-Wave Network Management Office.

#### Customer role

- Participate in the N-Wave Engineering Review Board (ERB) as required
- Specify points of contacts for notification in the event of an outage or planned event that may impact service
- Notify the N-Wave NOC of outages and performance issues that may be network related that have not been proactively identified ([see key service: Network Operations](#))
- Specify network requirements for any new or modified service including:

- Bandwidth
  - Source and destination IP addresses
  - Ports and protocols to be used
  - Any Quality of Service (QOS) requirements
- Recommend maintaining a local program metric on N-Wave availability as independent verification of the network availability
- Support equipment hosting and environmental controls of N-Wave hardware in support of the customer site
- Provide a technical point of contact along with a group email address

#### **How to access this service**

For further inquiries to this service please contact the N-Wave Program Management Office:

N-Wave Network Outreach Office  
 Rhonda Lange  
 303-497-6045  
[Rhonda.K.Lange@noaa.gov](mailto:Rhonda.K.Lange@noaa.gov)

N-Wave Network Manager  
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N-Wave Network Deputy Manager  
 Robert Sears  
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## **2. Key Technical Service: Network Operations Center Support**

### **Service description**

Network Operations provides the day to day monitoring, operations, configuration and support of these provided services:

1. N-Wave Science Network
2. Trusted Internet Connection Access Provider Transport and Integration

These services are known as N-Wave Network Operation Center services provided by the Global Research Network Operations Center or GRNOC.



Network Operations also includes the technical activities involved with the NOAA network consolidation initiative where network operations in Boulder, Seattle and Fort Worth will be standardized under the management of the N-Wave Management Office.

**Activities include:**

- 24x7x365 support to the N-Wave network, providing a network knowledgeable Tier One operation, with its primary focus centered on expert customer service
- Provide and answer a dedicated N-Wave phone number, e-mail address, and web-based problem submittal form.
- Ensure all facets of the problem management cycle are complete and performed to satisfaction. This includes monitoring, problem assessment and triage, customer contact, assigning tickets to engineering, N-Wave community notification, problem resolution, and customer satisfaction contact
- Engage all N-Wave engineers, internal NOAA engineers and groups, RONS, vendors, and national network providers (Internet2/NLR) to facilitate problem resolution
- Make direct contact with upstream or downstream organizations affected by the network trouble via e-mail or phone calls, and provide updates as needed
- Routinely generate weekly, quarterly, and annual reports that reflect outage and maintenance activity, network availability statistics, and general trouble ticket analysis
- Provide a Specialized Support Technician (SST) who will perform the following duties:
  - Serve as the primary customer interface for technical needs
  - Serve as a primary interface with the other N-Wave technical support service groups, RONS and N-Wave administration support
  - Responsible for overseeing the preparation of necessary Service Desk documentation, training, escalation list and other notification lists for Service Desk use
  - Work on special projects, such as network upgrades, or other unique efforts with N-Wave engineer
- Provide N-Wave with Tier2 network engineering services on a 24x7 basis. This team has expertise in a broad range of networking technologies, most specifically including DWDM, Ethernet, and IP on a broad range of vendor platforms.
- Lead and maintain integrated change management policies and procedures across the program
- Provide N-Wave with a suite of tools that is customized for N-Wave support operations. This team provides system administration and programming expertise for the tools used by the N-Wave NOC operations.
- Provide integration of all activities noted above for the networking

components of the Boulder, Seattle and Fort Worth for network operations consolidation

- Provide integration of all activities noted above for the networking components of the Boulder, Seattle and Fort Worth designated TICAP locations

### Service characteristics

Ongoing service to support NOAA customers of N-Wave and TICAP network transport

#### Regular Support Hours:

N-Wave Network Operations Center is reachable 24 hours a day, 365 days a year.

- Telephone: 812-856-7477
- Email address: [nwave-noc@noaa.gov](mailto:nwave-noc@noaa.gov)
- Use a form to [Report a Problem](#) - automatically generates a trouble ticket

### Service level objective

#### Service level targets:

Ensure the security of the network by meeting DOC/NOAA policies, procedures and controls, and guidance of FIPS 199 and NIST SP 800-60 categorization for moderate systems.

#### Expected N-Wave NOC Engineer Response Times

These are the guidelines for how soon after a problem is reported and a ticket has been created and assigned to an engineer that investigation must begin. (*For full Details refer to Appendix A N-Wave NOC Support - Response Time Agreements*)

Impact Level / Priority	Investigation
Critical/1	10 Minutes
High/2	1 hour
Elevated/3	1 Day
Normal/4	3 Days

Customer Impact is a subjective scale of measure used to quantify the current impact of a problem or maintenance on the customer's operations, performance, and usability. Set in conjunction with the customer, it may

change as the ticket progresses and is used for ticket escalation. Customer Impact seeks to answer, "How high of a priority is the problem/maintenance to the customer?"

#### **1-CRITICAL**

- A problem or issue for which the customer needs immediate, undivided attention from NOC staff until resolved.
- The customer is expected to be available immediately to commit full-time resources until the situation is resolved.
- The NOC uses this by default when the network is monitored to have an outage of a non-redundant core network element.

#### **2-HIGH**

- A problem or issue for which the customer needs resolution within 1 business day.
- The customer is expected to commit resources to resolve the situation between the hours of 1300 and 0100 UTC (1200 and 0000 UTC when Daylight Saving Time is in effect).
- The NOC uses this by default when the network is monitored to have an outage of a redundant core network element.

#### **3-ELEVATED**

- A problem or issue, for which the customer does not need immediate resolution, but needs NOC attention within 3 business days.
- The customer is expected to be available to provide information or assistance when available during normal business hours.
- The NOC uses this by default when a customer connection or session is monitored to have a problem or outage. This is also used by default for maintenance, which is both NOC initiated and customer impacting.

#### **4-NORMAL**

- No impact to the customer's operations, performance, and usability.
- Non-urgent customer service requests.
- Routine installation/provisioning tickets, non-customer impacting maintenance, and customer initiated maintenance.

#### **Customers of this service**

- All customers who utilize N-Wave for network transport
- All TICAP customers at the Boulder, Seattle, and Fort Worth locations

#### **Business processes enabled by this service**

This service is managed under the N-Wave Network Management Office.

Customer role
<ul style="list-style-type: none"> <li>• Utilize the Network Operations Center support contact information provided</li> <li>• Ensure technical points of contact are available within the organization to aid in troubleshooting</li> </ul>
How to access this service
<p>N-Wave Network Operations Center is reachable 24 hours a day, 365 days a year.</p> <ul style="list-style-type: none"> <li>• - Telephone: 812-856-7477</li> <li>• - Email address: <a href="mailto:nwave-noc@noaa.gov">nwave-noc@noaa.gov</a></li> <li>• Use a form to <a href="#">Report a Problem</a> - automatically generates a trouble ticket</li> </ul>

### 3. Key Technical Service: Network Assessment, Consulting, Design and Support

Service description
<p>The N-Wave Network Management Office employs senior level network engineers, both federal and contractor, along with Subject Matter experts who collectively provide a vast set of advanced networking skill across multiple areas of support to include high performance computing and research and education networking.</p> <p>Customers who require skilled engineering for assistance with their own deployed networks, network consolidation activities and or Trusted Internet Connection initiatives can utilize this wealth of knowledge.</p> <p><b>Activities include:</b></p> <ul style="list-style-type: none"> <li>• Independent network assessment and validation of customer's as is network</li> <li>• Recommendations for customer network upgrades, enhancements, consolidation and cost efficiencies</li> <li>• Engineering and design for customer access to NOAA Trusted Internet Connect Access Providers (TICAP)</li> <li>• Project Management assistance</li> </ul>
Service characteristics
<p>Initiated by requesting customer</p> <ul style="list-style-type: none"> <li>• Full Project Plan will be provided to customer for each activity</li> <li>• Objectives, task and expected results will be tailored to meet customer</li> </ul>

budgetary requirements
<b>Service level objective</b>
<p><b>Service level targets:</b></p> <ul style="list-style-type: none"> <li>• Adhere to project plan set milestones</li> <li>• Ensure constant communication with customers during project</li> </ul>
<b>Customers of this service</b>
NOAA line offices and programs may seek network assessment consulting and design services
<b>Business processes enabled by this service</b>
This service is managed under the N-Wave Network Management Office.
<b>Customer role</b>
<ul style="list-style-type: none"> <li>• Provide statement of need outlining desired engineering services</li> <li>• Provide stakeholder points of contact along with a group email address</li> <li>• Review and provide project proposal and provide feedback for proper project initiation</li> </ul>
<b>How to access this service</b>
<p>For further inquiries to this service please contact the N-Wave Network Management Office:</p> <p>N-Wave Network Outreach Office  Rhonda Lange  303-497-6045  <a href="mailto:Rhonda.K.Lange@noaa.gov">Rhonda.K.Lange@noaa.gov</a></p> <p>N-Wave Network Manager  Jerry Janssen  303-497-6647  <a href="mailto:jerry.janssen@noaa.gov">jerry.janssen@noaa.gov</a></p> <p>N-Wave Network Deputy Manager  Robert Sears  303-497-4226  <a href="mailto:Robert.Sears@noaa.gov">Robert.Sears@noaa.gov</a></p>

#### 4. Key Technical Service: Trusted Internet Connection Access Provider

##### Service description

By OMB mandate, NOAA is required to route external network traffic through an established Trusted Internet Connection Access Provider (TICAP) by the end of FY13. All non-compliant Systems are required to have an approved POA&M in place in order to maintain their ATO.

The current NOAA plan is to have TICAPs geographically distributed throughout the continental US:

1. Silver Spring, MD
2. Boulder, CO
3. Sand Point, WA
4. Fort Worth, TX
5. A request has been submitted, but not yet approved, for one in Hawaii.

The service provider for external network traffic in Silver Spring is the [SSMC NOC](#). For all other locations, the service provider is the N-Wave Management Office. The N-Wave Network Management office will integrate the Boulder, Seattle and Fort Worth TICAP sites under a single management process for unified TICAP availability.

##### Activities include:

- Consolidated Management of Boulder, Seattle and Fort Worth TICAP sites to include management, configuration and operation of current in place site border routers and key network devices.
- Commodity Internet Access for all TICAP customers
- Research and education network (Internet2, National LambdaRail) access for TICAP customers
- Peering with University, Research and education, and other government agencies
- TICAP redundancy per customer request
- Assist with remote customer access to TICAP sites to include use of N-Wave and or other telecommunications services for TICAP access
- Provide engineering for provisioning remote customer access to TICAP sites
- Interface with the NOAA SOC for network connectivity to TICAP security device stack

##### Service characteristics

<p>Initiated by requesting customer</p> <ul style="list-style-type: none"> <li>• Full Project Plan and technical details will be provided to customer for TICAP connectivity</li> <li>• All connection agreements will be coordinated between the N-Wave Network Management Office and customer</li> <li>• N-Wave Network Management Office will interface with customers on TICAP security posture, deployment and impacts</li> </ul>
<b>Service level objective</b>
<p><b>Service level targets:</b></p> <ul style="list-style-type: none"> <li>• Adhere to project plan set milestones</li> <li>• Ensure constant communication with customers during project</li> <li>• Ensure NOAA SOC policies and procedures are passed down to TICAP customers</li> <li>• TICAP redundant connectivity for higher availability (TBD)</li> </ul>
<b>Customers of this service</b>
<p>NOAA line offices and programs who seek access to the Boulder, Seattle and Fort Worth designated TICAPS</p>
<b>Business processes enabled by this service</b>
<p>This service is managed under the N-Wave Network Management Office.</p>
<b>Customer role</b>
<ul style="list-style-type: none"> <li>• Provide desired TICAP location access</li> <li>• Inform of desire for redundant TICAP access</li> <li>• Provide estimated bandwidth requirements</li> </ul>
<b>How to access this service</b>
<p>For further inquiries to this service please contact the N-Wave Network Management Office:</p> <p>N-Wave Network Outreach Office  Rhonda Lange  303-497-6045  <a href="mailto:Rhonda.K.Lange@noaa.gov">Rhonda.K.Lange@noaa.gov</a></p> <p>N-Wave Network Manager</p>

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